

Application No. 10/774,116
Reply to Office Action of May 3, 2006

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REMARKS AND ARGUMENTS

The present application includes pending claims 1-18.

Claim Rejections Based on 35 U.S.C. § 103(a)

Claims 1-18 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Yifeng Zhang, hereinafter Zhang, United States Patent No. 6,670,900 B1, in view of John H. Cafarella, hereinafter Cafarella, United States Patent Application Publication No. US 2003/0223480 A1.

The Applicant respectfully submits that the claims define patentable subject matter. Accordingly, the Applicant respectfully traverses these rejections and requests reconsideration of the claims in view of the following remarks.

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All Reasons and Bases for Rejecting Claims Set Forth In Office Action

Initially, the Applicant notes that a goal of patent examination is to provide a prompt and complete examination of a patent application.

It is essential that patent applicants obtain a prompt yet complete examination of their applications. Under the principles of compact prosecution, each claim should be reviewed for compliance with every statutory requirement for patentability in the *initial review* of the application, even if one or more claims are found to be deficient with respect to some statutory requirement. Thus, Office personnel *should* state *all* reasons and bases for rejecting claims in the *first* Office action. Deficiencies should be explained clearly, particularly when they serve as a basis for a rejection. Whenever practicable, Office personnel should indicate how rejections may be overcome and how problems may be resolved. A failure to follow this approach can lead to unnecessary delays in the prosecution of the application.

Manual of Patent Examining Procedure (MPEP) § 2106(II). As such, the Applicant assumes, based on the goals of patent examination noted above, that the present Office Action has set forth "all reasons and bases" for rejecting the claims.

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REJECTION TO THE CLAIMS UNDER 35 U.S.C. § 103

Regarding Claims 1-18, the Office Action states "Claims 1-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang (US 6,670,900) in view of Cafarella (US 2003/0223480).

Claim Rejections under 35 U.S.C. § 103

With regard to an obviousness rejection, in order for a *prima facie* case of obviousness to be established, the MPEP 2142 states that the following three basic criteria must be met:

First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. **Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.** The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicants disclosure.

Manual of Patent Examining Procedure MPEP at § 2142, citing *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) (emphasis added). Additionally, if a *prima facie* case of obviousness is not established, the Applicant is under no obligation to submit evidence of nonobviousness.

The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under

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no obligation to submit evidence of nonobviousness.

See Manual of Patent Examining Procedure MPEP at § 2142.

Further, MPEP 2143.01 states that "the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art suggests the desirability of the combination," and that "although a prior art device 'may be capable of being modified to run the way the apparatus is claimed, there must be a *suggestion or motivation in the reference to do so*'" (citing *In re Mills*, 916 F.2d 680, 16 USPQ 2d 1430 (Fed. Cir. 1990)). Moreover, MPEP 2143.01 also states that "the level of ordinary skill in the art cannot be relied upon to provide the suggestion ...," citing *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 50 USPQ 2d 1161 (Fed. Cir. 1999).

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Rejection for Claim 1

With regard to Claim 1, the Office Action states, "Zhang teaches a method for measuring receiver mixer IQ mismatch in a transceiver, the method comprising: Providing a training signal for a *receiver filter*, the training signal having periodic uncorrelated I and Q signals (figure 1, column 3, line 39 to column 4, line 8); Providing a training signal for a *receiver filter*, the training signal having periodic uncorrelated I and Q signals (column 4, lines 9-18); Determining a phase mismatch in the receiver mixer from IQ correlation over a unit period; and Determining a gain mismatch in the receiver mixer from a power estimate of both I and Q signal for the unit period (column 4, line 58 to column 5, line 35, receiver calibration is performed during windows of the example OFDM signal where an inverse of a determined imbalance matrix comprising gain and phase imbalance values are applied at the post distortion component (340) to the I and Q signal)."

The Office Action further states, "Zhang is silent as to providing a training signal for a receiver mixer. Cafarella teaches a method to calibrate the I/Q balance where the calibration signal is generated in the baseband DSP and upconverted to RF in the transmit chain prior to injection prior to the receive mixers of the receive chain during a guard time interval or unit period, figures 1a, 1b and 4, paragraphs 0036-0038 and paragraph 0042). It would have been obvious to one of ordinary skill in the art at the time of the invention to recognize the baseband I/O receiver calibration method of Zhang as expanded to include the RF and mixer components as taught by Cafarella to additionally compensate for the receiver downconversion components as well as the baseband contributions to I/Q imbalance."

In response to the rejection for Claim 1, the Applicant respectfully asserts that Zhang does not disclose "the training signal having periodic, uncorrelated I and Q signals," in figure 1, column 3, line 39 to column 4, line 8." Additionally, Zhang does not disclose "the training signal having periodic, uncorrelated I and Q signals," at

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column 4, lines 9-18. The Office Action further states, "Zhang is silent as to providing a training signal for a receiver mixer." To cure this defect in Zhang, the Office Action looks to Cafarella to provide "a training signal for a receiver mixer." Hence, even if Cafarella discloses "a training signal for a receiver mixer" and it was properly combinable with Zhang, it would have to disclose at least a **"training signal having periodic, uncorrelated I and Q signals."**

Accordingly, the Applicant respectfully asserts that even if Zhang and Cafarella were properly combinable, which the Applicant respectfully asserts they are not properly combinable, neither Zhang nor Cafarella, whether taken individually or combined, disclose at least the limitation of **"the training signal having periodic uncorrelated I and Q signals."** (*Emphasis added*).

Zhang, at column 3, line 39 to column 4, line 8, states:

In accordance with this invention, an autonomous calibration/compensation system 300 is included within the receiver 100 and transmitter 200 of the transceiver. To compensate for the phase-shifts produced by the filter 230 in the transmitter 200, a pre-distortion component 330 is provided that bit-phase-shifts one of the digital input streams such that the outputs from the filters 230 are in-phase with each other, corresponding to the assumed in-phase relationship between the two digital input streams. That is, as required, the pre-distortion component 330 delays one of the I or Q digital input streams, based on the analog-phase-shift that is produced by the filters 230, as fabricated. Although an independent output processor could be used to determine the phase shift that is introduced by the transmit filters 230, a preferred embodiment of this invention uses the output of the ADCs 150 to decode the analog outputs from the filters 230. In-phase test signals are applied to the DACs 220 and filters 230, and the degree of bit-shift that is introduced by the filters 230 and DAC 220 is determined by comparing the output of the ADCs 150 to the in-phase test signals. To compensate for phase-shifts produced by the filter 130 in the receiver 100, a post-distortion component 340 applies a bit-phase-shift to one of the I/Q digital output streams from the receiver 100 so that the streams are placed back in-phase, corresponding to their assumed in-phase condition from the mixers 120. That is, as

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required, the post-distortion component 340 delays one of the I or Q output streams, based on the analog-phase-shift that is produced by the filters 130 as fabricated. **Although an independent test signal could be generated to determine the required compensation**, a preferred embodiment of this invention uses the "in-phase" channel signals from the transmitter 200. Again, a test sequence is applied to the input of the transmitter 200, and the output of the ADCs 150 are compared to the test sequence to determine the amount of bit-phase-shift that is caused by the analog-phase-shift introduced by the filters 130.

Although Zhang states, "Although an independent output processor could be used to determine the phase shift that is introduced by the transmit filters 230, a preferred embodiment of this invention uses the output of the ADCs 150 to decode the analog outputs from the filters 230, a preferred embodiment of this invention uses the output of the ADCs 150 to decode the analog outputs from the filters 230" and **"Although an independent test signal could be generated to determine the required compensation**, a preferred embodiment of this invention uses the "in-phase" channel signals from the transmitter 200," Zhang fails to disclose both **"a training signal"** and **"a training signal having periodic uncorrelated I and Q signals."** (Emphasis added).

With regard to Cafarella, the Applicant respectfully asserts that none of figure 1a, 1b, and 4, and paragraphs [0036]-[0038] and [0042] disclose, **"a training signal having periodic uncorrelated I and Q signals."** Cafarella states, at paragraphs [0036]-[0038]:

[0036] The present invention is directed to a system for and method of injecting the transmit signal into the receive chain of the transceiver in order to support calibration independently of the I-Q gain balance of the both transmit and receive chains in their entirety, as required for proper operation among multiple users. This provides comprehensive I-Q gain balance, and in addition can be effected with non-critical circuit layout for the injection signal path. Furthermore, the calibration signals can originate at baseband in the transmit channel, and be observed at baseband in the receive channel. Consequently, there is minimal impact on the circuit layout to implement this calibration technique. While motivated primarily to enable

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realization of direct-conversion transceivers, this calibration method can be applied to heterodyne-conversion or alternative transceiver structures which implement less of the required gain at baseband.

[0037] More specifically, in order to attain high accuracy in the I-Q gain balance, a calibration signal is applied to the baseband input of the transmit chain. This signal is amplified and converted to a signal at the transmit RF port as would be any transmit signal during normal operation. Thus, this transmit RF signal includes all gains relevant to normal operation in the transmit chain.

[0038] A signal injection path is made available from the transmit RF output to the receive RF input of the transceiver. This injection path would be substantially suppressed in normal transceiver operation so as not to degrade receiver noise figure. The amplitude and phase accuracy for the injection path are generally non-critical, and the overall calibration process should be designed to not require excessive design stress on the injection path.

Cafarella further states, at paragraph [0042]:

[0042] In some applications the need for recurrent calibration cycles might be objectionable. However, commonly a transceiver operates in half-duplex, and often with substantial structure in the pattern of transmissions and receptions. For example, there is usually a guard time interval, for example the inter-frame space in wireless LANs, during which a transceiver just having finished a transmission could perform a calibration cycle with no impact on system operation.

Cafarella also fails to disclose both **"a training signal"** and **"a training signal having periodic uncorrelated I and Q signals."** (*Emphasis added*).

With regard to the Office Action statement that, "Determining a phase mismatch in the receiver mixer from IQ correlation over a unit period; and Determining a gain mismatch in the receiver mixer from a power estimate of both I and Q signal for the unit period" are disclosed in Zhang at column 4, line 58 to column 5, line 35, since "receiver calibration is performed during windows of the example OFDM signal where an inverse of a determined imbalance matrix comprising gain and phase imbalance values are

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applied at the post distortion component (340) to the I and Q signal)," the Applicant respectfully refutes such a finding.

Zhang at column 4, line 58 to column 5, line 35 states:

In a preferred embodiment, during receiver calibration with the pre-distortion component 330 enabled to compensate for the transmitter I/Q imbalance, and the post-distortion component 340 disabled, a signal $I_n = \cos(\omega_n t)$ is applied to the I input, and $Q_n = \sin(\omega_n t)$ is applied to the Q input of the transmitter 200, for each of the sub-carriers of the OFDM signal, where ω_n is the n th sub-carrier of the OFDM signal. As illustrated in FIG. 1, in the receive-calibration mode, the output of the filters 230 from this applied input is fed directly to the filters 130 in the receiver 100. ... To compensate for this receiver I/Q imbalance, the inverse of the imbalance matrix A_{Rn} , is applied at the post-distortion component 340 at each ω_n ... By applying the inverse of the transmitter I/Q imbalance at the pre-distortion component 330, and the inverse of the receiver I/Q imbalance at the post-distortion component 340, the effects of transmitter and receiver I/Q imbalance in a transceiver are minimized.

Zhang's alleged performing of receiver calibration during "windows of the OFDM signal where an inverse of a determined imbalance matrix comprising gain and phase imbalance values are applied at the post distortion component (340) to the I and Q signal)," is not the same as the Applicant's "Determining a phase mismatch in the receiver mixer from IQ correlation over a unit period." Furthermore, Zhang's alleged performing of receiver calibration during "windows of the OFDM signal where an inverse of a determined imbalance matrix comprising gain and phase imbalance values are applied at the post distortion component (340) to the I and Q signal)," is not the same as the Applicant's "Determining a gain mismatch in the receiver mixer from a power estimate of both I and Q signal for the unit period."

The Applicant respectfully asserts that the Examiner has mischaracterized Zhang by erroneously stating that Zhang performs receiver calibration during "windows of the OFDM signal where and inverse of a determined imbalance matrix comprising gain and phase imbalance values are applied at the post distortion component (340) to the I and Q signal)." Instead, Zhang states:

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"a signal $I_n = \cos(\omega_n t)$ is applied to the I input, and $Q_n = \sin(\omega_n t)$ is applied to the Q input of the transmitter 200, for each of the sub-carriers of the OFDM signal, where ω_n is the nth sub-carrier of the OFDM signal." See Zhang at column 4, lines 20-22.

Zhang further states:

"To compensate for this receiver I/Q imbalance, the inverse of the imbalance matrix A_{Rn} is applied at the post-distortion component 340 at each ω_n . See Zhang at column 5, lines 24-26.

Hence, Zhang does not disclose "Determining a phase mismatch in the receiver mixer from IQ correlation over a unit period, nor does Zhang disclose "Determining a gain mismatch in the receiver mixer from a power estimate of both I and Q signal for the unit period."

The Applicant further asserts that, since Zhang does not disclose "a **training signal having periodic, uncorrelated I and Q signals**," Zhang clearly cannot "determine I and Q correlation over a unit period." Additionally, since Zhang does not disclose "a **training signal having periodic, uncorrelated I and Q signals**," Zhang clearly cannot determine "a **phase mismatch in the receiver mixer from IQ correlation over a unit period**."

Accordingly, at least for the reasons cited herein, the Applicant respectfully asserts that neither Zhang, nor Cafarella, nor Zhang in view of Cafarella teaches the Applicant's claimed invention. At least for these reasons, the Applicant respectfully requests that the rejection be withdrawn, and Claims 1 and 13 allowed. The Applicant reserves the right to argue additional reasons that support the allowability of rejected Claim 1 and 13, should such a need arise.

Rejections for Claims 2 and 14

With regard to Claims 2 and 14, the Office Action states, "Cafarella [in view] of Zhang modified teaches the method of Claims 1 and 13 wherein providing a training signal further comprises closing an RF signal path between a transmitter and the receiver mixer and generating the training signal with the

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transmitter (figure 4, paragraphs 0037-0039)."

In response to the rejection for Claims 2 and 14, the Applicant respectfully asserts that neither Zhang nor Cafarella, and/or Zhang in view of Cafarella, disclose at least the limitation of "a **training signal having periodic, uncorrelated I and Q signals.**" Furthermore, Zhang in view of Cafarella does not disclose the method of Claims 1 and 13, respectively, nor a "training signal further comprises closing an RF signal path between a transmitter and the receiver mixer and generating the training signal with the transmitter." Since Claims 2 and 14 depend from independent Claims 1 and 13 respectively, which are believed to be allowable, Claims 2 and 14 are believed to be allowable.

Accordingly, at least for the reasons cited herein, the Applicant respectfully asserts that neither Zhang, nor Cafarella, nor Zhang in view of Cafarella teaches the Applicant's claimed invention. As a result, the Applicant respectfully requests that the rejection for Claims 2 and 14 be withdrawn, and Claims 2 and 14 allowed. The Applicant reserves the right to argue additional reasons that support the allowability of rejected Claims 2 and 14, should such a need arise.

Rejections for Claims 3 and 15

With regard to Claims 3 and 15, the Office Action states, "Zhang teaches the method of Claim 1 and 13 further comprising estimating the I/Q mismatch iteratively (column 3, line 59 to column 5, line 18, test sequence, also, Cafarella: paragraphs 0020 and 0070, convergence of the process might require several basic cycles of calibration)."

In response to the rejection for Claims 3 and 15, the Applicant respectfully asserts that neither Zhang nor Cafarella, and/or Zhang in view of Cafarella, disclose at least the limitation of "a **training signal having periodic, uncorrelated I and Q signals.**" Furthermore, Zhang in view of Cafarella does not disclose the method of Claim 1 and 13, respectively, nor "estimating the I/Q mismatch iteratively." Since Claims 3 and 15 depends from independent Claims 1 and 13 respectively, which are believed to be allowable, Claims 3 and 15 are believed to be allowable.

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Accordingly, at least for the reasons cited herein, the Applicant respectfully asserts that neither Zhang, nor Cafarella, nor Zhang in view of Cafarella teaches the Applicant's claimed invention. As a result, the Applicant respectfully requests that the rejection for Claims 3 and 15 be withdrawn, and Claims 3 and 15 allowed. The Applicant reserves the right to argue additional reasons that support the allowability of rejected Claims 3 and 15, should such a need arise.

Rejections for Claims 4 and 16

With regard to Claims 4 and 16, the Office Action states, "Zhang teaches the method of Claims 4 and 16 further comprising utilizing a pre-compensated signal as a measurement signal for the iterative estimation (column 4, line 58 to column 5, line 1)."

In response to the rejection for Claims 4 and 16, the Applicant respectfully asserts that neither Zhang nor Cafarella, and/or Zhang in view of Cafarella, disclose at least the limitation of "a **training signal having periodic, uncorrelated I and Q signals.**" Furthermore, Zhang in view of Cafarella does not disclose the method of Claims 4 and 16, respectively, nor "utilizing a pre-compensated signal as a measurement signal for the iterative estimation." Since Claims 4 and 16 depend on Claims 3 and 15, respectively, which depends from independent Claims 1 and 13 respectively, which are believed to be allowable, Claims 4 and 16 are believed to be allowable.

Accordingly, at least for the reasons cited herein, the Applicant respectfully asserts that neither Zhang, nor Cafarella, nor Zhang in view of Cafarella teaches the Applicant's claimed invention. As a result, the Applicant respectfully requests that the rejection for Claims 4 and 16 be withdrawn, and Claims 4 and 16 allowed. The Applicant reserves the right to argue additional reasons that support the allowability of rejected Claims 4 and 16, should such a need arise.

Rejection to Claims 5 and 17

With regard to Claims 5 and 17, the Office Action states, "Zhang teaches the

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method of Claims 3 and 15 further comprising performing post-correction using a latest available correction parameter and further estimating residual mismatch from post correction signals (column 5, lines 1-35, imbalance matrix is applied at the post distortion component (340) at each frequency, the test sequence)."

In response to the rejection for Claims 5 and 17, the Applicant respectfully asserts that neither Zhang nor Cafarella, and/or Zhang in view of Cafarella, disclose at least the limitation of "a **training signal having periodic, uncorrelated I and Q signals.**" Furthermore, Zhang in view of Cafarella does not disclose the method of Claims 3 and 15, respectively, nor "performing post-correction using a latest available correction parameter and further estimating residual mismatch from post correction signals." Since Claims 5 and 17 depend on Claims 3 and 15, respectively, which depends from independent Claims 1 and 13 respectively, which are believed to be allowable, Claims 5 and 17 are believed to be allowable.

Accordingly, at least for the reasons cited herein, the Applicant respectfully asserts that neither Zhang, nor Cafarella, nor Zhang in view of Cafarella teaches the Applicant's claimed invention. As a result, the Applicant respectfully requests that the rejection for Claims 5 and 17 be withdrawn, and Claims 5 and 17 allowed. The Applicant reserves the right to argue additional reasons that support the allowability of rejected Claims 5 and 17, should such a need arise.

Rejection to Claims 6 and 18

With regard to Claims 6 and 18, the Office Action states, "Zhang teaches the method of Claims 1 and 13 further comprising utilizing matrix multiplication to perform mismatch compensation (column 5, lines 1-35, the inverse of the imbalance matrix is applied at each frequency)."

In response to the rejection for Claims 6 and 18, the Applicant respectfully asserts that neither Zhang nor Cafarella, and/or Zhang in view of Cafarella, disclose at least the limitation of "a **training signal having periodic, uncorrelated I and Q signals.**" Furthermore, Zhang in view of Cafarella does not disclose the method of Claim 1, nor "utilizing matrix multiplication to perform mismatch compensation."

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Since Claims 6 and 18 depend from independent Claims 1 and 13 respectively, which are believed to be allowable, Claims 6 and 18 are believed to be allowable.

Accordingly, at least for the reasons cited herein, the Applicant respectfully asserts that neither Zhang, nor Cafarella, nor Zhang in view of Cafarella teaches the Applicant's claimed invention. As a result, the Applicant respectfully requests that the rejection for Claims 6 and 18 be withdrawn, and Claims 6 and 18 be allowed. The Applicant reserves the right to argue additional reasons that support the allowability of rejected Claims 6 and 18, should such a need arise.

Rejection to Claims 7 and 13

With regard to Claims 7 and 13, the Office Action states, "Zhang teaches a method and system for estimation of receiver filter IQ mismatch comprising: A transceiver, the transceiver including a transmitter and a receiver, the transmitter providing a training signal for a receiver baseband filter, the training signal having periodic n correlated I and q signals (figure 1, column 4, lines 9-18 and line 58 to column 5, line 23); and A processor coupled to the receiver, the processor determining a phase mismatch in the receiver mixer from IQ correlation over a unit period, and determining a gain mismatch in the receiver mixer from a power estimate of both I and Q signal for the unit period (figure 1, column control components calibration control (310), post-distortion (340 and pre-distort (330) comprise the processor of calibration/compensation system (300) and determining phase and gain imbalance in the transmitter/receiver calibration of the respective baseband filters: column 4, line 19 to column 5, line 35). Zhang is silent as to providing a training signal for a receiver mixer."

The Office Action further states "Cafarella also teaches a method to calibrate the I/Q balance where the calibration signal is generated in the baseband DSP and upconverted to RF in the transmit chain prior to injection prior to the receive mixers of the receive chain during a guard time interval or unit period, figures 1a, 1b and 4, paragraphs 0036-0038 and paragraph 0042.). It would have been obvious to one of ordinary skill in the art at the time of the invention to recognize the baseband

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I/Q receiver calibration method of Zhang as expanded to include the RF and mixer components as taught by Cafarella to additionally compensate for the receiver downconversion components as well as the baseband contributions to I/Q imbalance."

In response to the rejection for Claims 7 and 13, the Applicant respectfully asserts that neither Zhang nor Cafarella, and/or Zhang in view of Cafarella, disclose at least the limitation of "a **training signal having periodic, uncorrelated I and Q signals,**" based on at least the arguments presented with regards to independent Claim 1.

Accordingly, at least for the reasons cited herein, the Applicant respectfully asserts that neither Zhang, nor Cafarella, nor Zhang in view of Cafarella teaches the Applicant's claimed invention. As a result, the Applicant respectfully requests that the rejection for Claims 7 and 13 be withdrawn, and Claims 7 and 13 allowed. The Applicant reserves the right to argue additional reasons that support the allowability of rejected Claims 7 and 13, should such a need arise.

Rejection to Claim 8

With regard to Claim 8, the Office Action states, "Cafarella of Zhang modified teaches the system of claim 7 wherein the transmitter provides a training signal on a closed RF signal path between the transmitter and the receiver mixer (figure 4, paragraph 0038)."

In response to the rejection for Claim 8, the Applicant respectfully asserts that neither Zhang nor Cafarella, and/or Zhang in view of Cafarella, disclose at least the limitation of "a **training signal having periodic, uncorrelated I and Q signals.**" Furthermore, Zhang in view of Cafarella does not disclose the system of Claim 7, nor that "the transmitter provides a training signal on a closed RF signal path between the transmitter and the receiver mixer." Since Claim 8 depends from independent Claim 7, which is believed to be allowable, Claim 8 is believed to be allowable.

Accordingly, at least for the reasons cited herein, the Applicant respectfully asserts that neither Zhang, nor Cafarella, nor Zhang in view of Cafarella teaches the

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Applicant's claimed invention. As a result, the Applicant respectfully requests that the rejection for Claim 8 be withdrawn, and Claim 8 be allowed. The Applicant reserves the right to argue additional reasons that support the allowability of rejected Claim 8, should such a need arise.

Rejection to Claim 9

With regard to Claim 9, the Office Action states, "Zhang teaches the method of claim 9 further comprising estimating the I/O mismatch iteratively (column 3, line 59 to column 5, line 18, test sequence, also, Cafarella: paragraphs 0020 and 0070, convergence of the process might require several basic cycles of calibration)."

In response to the rejection for Claim 9, the Applicant respectfully asserts that neither Zhang nor Cafarella, and/or Zhang in view of Cafarella, disclose at least the limitation of "a **training signal having periodic, uncorrelated I and Q signals.**" Furthermore, Zhang in view of Cafarella does not disclose the method of Claim 9, nor "estimating the I/O mismatch iteratively." Since Claim 9 depends from independent claim 7, which is believed to be allowable, Claim 9 is believed to be allowable.

Accordingly, at least for the reasons cited herein, the Applicant respectfully asserts that neither Zhang, nor Cafarella, nor Zhang in view of Cafarella teaches the Applicant's claimed invention. As a result, the Applicant respectfully requests that the rejection for Claim 9 be withdrawn, and Claim 9 be allowed. The Applicant reserves the right to argue additional reasons that support the allowability of rejected Claim 9, should such a need arise.

Rejection to Claim 10

With regard to Claim 10, the Office Action states, "Zhang teaches the system of claim 9 further comprising utilizing a pre-compensated signal as a measurement signal for the iterative estimation (column 4, line 58 to column 5, line 1)."

In response to the rejection for Claim 10, the Applicant respectfully asserts that neither Zhang nor Cafarella, and/or Zhang in view of Cafarella, disclose at least the

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limitation of "a **training signal having periodic, uncorrelated I and Q signals.**" Furthermore, Zhang in view of Cafarella does not disclose the system of Claim 9, nor "utilizing a pre-compensated signal as a measurement signal for the iterative estimation." Since Claim 10 depends from Claim 9, which depends from independent Claim 7, which are believed to be allowable, Claim 10 is believed to be allowable.

Accordingly, at least for the reasons cited herein, the Applicant respectfully asserts that neither Zhang, nor Cafarella, nor Zhang in view of Cafarella teaches the Applicant's claimed invention. As a result, the Applicant respectfully requests that the rejection for Claim 10 be withdrawn, and Claim 10 be allowed. The Applicant reserves the right to argue additional reasons that support the allowability of rejected Claim 10, should such a need arise.

Rejection to Claim 11

With regard to Claim 11, the Office Action states, "As to claim 11, Zhang teaches the system of claim 9 further comprising performing post-correction using a latest available correction parameter and further estimating residual mismatch form post correction signals (column 5, lines 1-35, imbalance matrix is applied at the post distortion component (340) at each frequency, the test sequence)."

In response to the rejection for Claim 11, the Applicant respectfully asserts that neither Zhang nor Cafarella, and/or Zhang in view of Cafarella, disclose at least the limitation of "a **training signal having periodic, uncorrelated I and Q signals.**" Furthermore, Zhang in view of Cafarella does not disclose the system of Claim 9, nor "performing post-correction using a latest available correction parameter and further estimating residual mismatch form post correction signals." Since Claim 11 depends from Claim 9, the latter of which depends from independent Claim 7, which are believed to be allowable, Claim 11 is believed to be allowable.

Accordingly, at least for the reasons cited herein, the Applicant respectfully asserts that neither Zhang, nor Cafarella, nor Zhang in view of Cafarella teaches the Applicant's claimed invention. As a result, the Applicant respectfully requests that the

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rejection for Claim 11 be withdrawn, and Claim 11 be allowed. The Applicant reserves the right to argue additional reasons that support the allowability of rejected Claim 11, should such a need arise.

Rejection to Claim 12

With regard to Claim 12, the Office Action states, "As to Claim 12, Zhang teaches the system of claim 7 further comprising utilizing matrix multiplication to perform mismatch compensation (column 5, lines 1-35, the inverse of the imbalance matrix is applied at each frequency."

In response to the rejection for Claim 12, the Applicant respectfully asserts that neither Zhang nor Cafarella, and/or Zhang in view of Cafarella, disclose at least the limitation of "a **training signal having periodic, uncorrelated I and Q signals.**" Furthermore, Zhang in view of Cafarella does not disclose the system of Claim 7 nor "utilizing matrix multiplication to perform mismatch compensation." Since Claim 12 depends from Claim 9, the latter of which depends from independent Claim 7, which are believed to be allowable, Claim 11 is believed to be allowable.

Accordingly, at least for the reasons cited herein, the Applicant respectfully asserts that neither Zhang, nor Cafarella, nor Zhang in view of Cafarella teaches the Applicant's claimed invention. As a result, the Applicant respectfully requests that the rejection for Claim 12 be withdrawn, and Claim 12 be allowed. The Applicant reserves the right to argue additional reasons that support the allowability of rejected Claim 12, should such a need arise.

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CHANGE OF THE ATTORNEY DOCKET NUMBER

The Applicant respectfully requests that the Attorney Docket number be changed to 17473US02. The Applicant respectfully requests that such change be made effective immediately in the official USPTO record and in any subsequent communication from the USPTO.

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CONCLUSION

Based on the foregoing, the Applicant believes that all Claims 1-18 are in condition for allowance. If the Examiner disagrees, the Applicant respectfully requests a telephone interview, and requests that the Examiner telephone the undersigned Attorney at (312) 775-8191.

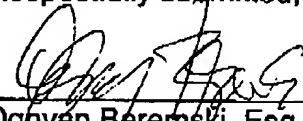
The Applicant reserves the right to argue additional reasons that support the Allowability of all rejected claims should that need arise.

The Commissioner is hereby authorized to charge any additional fees or credit any overpayment to the deposit account of McAndrews, Held & Malloy, Ltd., Account No. 13-0017.

A Notice of Allowability is courteously solicited.

Respectfully submitted,

Date: August 3, 2006



Ognyan Beremski, Esq.
Registration No. 51,458
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